The Global Innovation Index 2017
Innovation Feeding the World

Composite Indicators and Scoreboards Community of Practice
9 November 2017
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Joint Research Centre European Commission
9 November 2017
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1. Introduction and Rationale
2. Architecture and Metrics
3. Results and Impact
4. Lessons learned and Challenges
Introduction and Rationale
1.1 Introduction

- Measures innovation across some 127 economies
- Leading reference on innovation
- A ‘tool for action’ for decision makers with the goal of improving countries’ innovation performances
- Recognizes innovation as key driver of economic growth
- Offers a holistic analysis of innovation, applicable to both developed and emerging economies alike
- Helps monitor innovation progress on a yearly basis
1.2 Rationale

- Measuring innovation is complex and a moving target

  No simple formula

  1. Difficulty of right data selection
  2. Difficulty of right scaling
  3. Difficulty of right aggregation
  4. Keeping model constant versus dynamic

  Possible criticism: Nature of selection of variables & aggregation
Launched in 2007

Why

To find metrics and approaches that closely mirror innovation environments in society and go beyond traditional measures

How

Using a collection of metrics to monitor performance over time and to benchmark developments against countries, region and income peers
Architecture and Metrics
81 Metrics Create a Tool for Action

Architecture

Global Innovation Index (average)

Innovation Efficiency Ratio (ratio)

Innovation Input Sub-Index

Institutions
  - Political environment
  - Regulatory environment
  - Business environment

Human capital and research
  - Education
  - Tertiary education

Infrastructure
  - ICTs
  - General infrastructure
  - Ecological sustainability

Market sophistication
  - Credit
  - Investment
  - Trade, competition, & market scale

Business sophistication
  - Knowledge workers
  - Innovation linkages
  - Knowledge absorption

Innovation Output Sub-Index

Knowledge and technology outputs
  - Knowledge creation
  - Knowledge impact

Creative outputs
  - Intangible assets
  - Creative goods and services
  - Online creativity
The model includes 81 indicators, which fall within the following three categories:

1. **Quantitative/objective/hard data**
   - 57 indicators

2. **Composite indicators/index data**
   - 19 indicators

3. **Survey/qualitative/subjective/soft data**
   - 5 indicators

### Patent-related

- Patents filed in 2+ offices
- Patents by origin
- PCT patent applications

All scaled by bn PPP$ GDP
Results and Impact
3.1 Results: Global rankings of GII 2017 (top 10)

<table>
<thead>
<tr>
<th>Input Sub-Index</th>
<th>Output Sub-Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Singapore</td>
<td>1. Switzerland</td>
</tr>
<tr>
<td>2. Sweden</td>
<td>2. Netherlands</td>
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<tr>
<td>3. Switzerland</td>
<td>3. Sweden</td>
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<tr>
<td>4. Finland</td>
<td>4. Luxembourg</td>
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<td>5. USA</td>
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<td>6. Denmark</td>
<td>6. United Kingdom</td>
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<tr>
<td>7. United Kingdom</td>
<td>7. Germany</td>
</tr>
<tr>
<td>8. Hong Kong (China)</td>
<td>8. Ireland</td>
</tr>
<tr>
<td>10. Canada</td>
<td>10. Iceland</td>
</tr>
</tbody>
</table>

GII

1. Switzerland
2. Sweden
3. Netherlands
4. USA
5. United Kingdom
6. Denmark
7. Singapore
8. Finland
9. Germany
10. Ireland
Innovation and GDP per capita
GII 2017
(bubble size: population)
**Strength**

- Scores with percent ranks greater than the 10th largest percent rank among the 81 indicators in that economy.

**Weakness**

- Scores with percent ranks lower than the 10th smallest percent rank among the 81 indicators in that economy.

**Innovation Achievers (17)**

- Countries which GII scores are higher than expected, based on their level of economic development as measured by GDP per capita.

**Pillar Outperformers (35)**

- Countries that outperform their income group peers in four or more GII pillars.
The GII rankings generate high levels of ‘buzz’ but these are not whole story.
**Innovation Feeding the World: from Digital to Smart Agriculture**

- **Solving the food equation** (feeding 10 billion people while reducing pressure on natural resources (land, energy eg) requires innovation.

- A wave of new agricultural innovations is taking place (digital agriculture), but rolling out rather slowly in many parts of the world

- **Smart agriculture** (distribution, value chains) is now required on a global scale

- Policy makers have a responsibility to provide **funding mechanisms** to stimulate innovation in agriculture and food production, especially in developing countries, which have yet to benefit from earlier waves of agricultural innovations
Collaboration

Co-publishers
Cornell University • INSEAD • WIPO

Three Knowledge Partners:
Confederation of Indian Industry,
PricewaterhouseCoopers and Strategy&,
National Confederation of Industry and Serviço Brasileiro de Apoio às Micro e Pequenas Empresas

International Advisory Board
14 international experts

Independent statistical audit
Joint Research Centre of the European Commission
UN Secretary-General stressed that the GII is a ‘unique tool for refining innovation policies ...’, and for assessing where more efforts are urgently needed’
Impact and responsibility

- GII 2017 mentioned in over 6,300 articles worldwide
Regional launches and thematic events

Investigación y políticas públicas, claves de Latinoamérica en innovación

Por EFE - 21 Agosto, 2017 - EnCiencia Y Tecnología

San José, 21 ago (EFE).- Apostar con más fuerza por la investigación, políticas públicas, articuladas y una relación estrecha entre lo público y lo privado son los puntos claves para que Latinoamérica mejore sus niveles de innovación, afirmaron hoy expertos en la materia reunidos en Costa Rica.

El director adjunto de la Organización Mundial de Propiedad Intelectual (OMPI), Mario
Beyond impact: Responsibility

- **Better (and more) collection of innovation data.** Many countries have increased their collection and use of innovation metrics that conform to international standards.
- **Ten-year rich time-series dataset.**
  - Every year, the GII model is updated and revised, based on the latest knowledge on innovation systems theory and a thorough revision of available indicators;
  - But also, based on readership feedback from the international community and GII users (policymakers, academia, practitioners, etc.).
- **Identification of best practices and innovation achievers**
- Possibility of making intra-regional and intra-income group comparisons, which provide a more realistic basis for action.
In the case of developing and least developed countries, action in the field of innovation is not just about ‘refining’ existing policy frameworks, but very often designing and transforming whole national approaches for innovation.

- Innovation is a ‘mindset’
- Not only R&D investment is important
Lessons learned and Challenges
Innovation trends from 10 years of the GII

- Innovation activities confronted with low investment and resource constraints
- Evolving innovation landscape: emerging economies play increasingly role in innovation
- Good quality of innovation remains a distinct characteristic of innovation leaders
- The innovation divide remains
- Sub-Saharan Africa region sees the most significant improvements in the GII rankings, still needs support
- Key role of governments, and of public and coordinated private investments in creating sound innovation systems
Country profiles: an example for Indonesia
## Analysis of Broad trends

<table>
<thead>
<tr>
<th>Tool for policy advice</th>
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<td><strong>Analysis of Broad trends</strong></td>
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<table>
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<tr>
<th>Quantity of innovation-related investments too low</th>
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<tbody>
<tr>
<td>Quality indicators however are much better, such as university rankings or quality of scientific publications</td>
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<tr>
<td>Forward-looking indicators strong – gross investment, software spending, share of S&amp;T graduates</td>
</tr>
<tr>
<td>Perception-based indicators are strong – quality of university-industry relations,</td>
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</table>
Innovation Quality matters for impact: an example for China

- Not all innovation inputs and outputs are of equal quality
- China still 1st among middle-income countries
- China performs at the level of high income economies in quality of universities and quality of publications.
- The gap, although closing, remains large in patent quality
Successful innovation clusters are essential for achieving a competitive edge.
India Innovation Index

“GII gives us an opportunity to look at innovation and to rethink about our progress. ... also to compare with the best in the world, to look at best practices around and then learn from them”

• Rank Indian states on Innovations through country’s first online innovation index portal
• Framework structured based on the best practices followed in the GII indicators
• Adding India-centric parameters reflecting the Indian innovation ecosystem
• Capture data on innovation from all Indian states on innovation and regularly update it in real time
Points of action

• Continuous Action on missing data, in particular by developing and emerging countries:
  • Contact data providers and issue timely data
  • Search for advice on data submission from data providers and compiling institutions.
  • Other technical guidance from GII team.
Caveats and expectation management

- Policies take long to translate into improved ranking
- Do not over focus on a few positions up or down — the trend and innovation policy persistence matters.
- Adding new data points does not necessarily guarantee an increase in rank
Thank you for your attention

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#GII2017
Annexes
Income Group Rankings (top 3)

High Income
- Switzerland
- Sweden
- Netherlands

Upper-middle Income
- China
- Bulgaria
- Malaysia

Lower-middle Income
- Viet Nam
- Ukraine
- Mongolia

Low Income
- United Rep. Tanzania
- Rwanda
- Senegal
Regional Rankings – Top 3

Central and Southern Asia
- India (1)
- Republic of Iran (2)
- Kazakhstan (3)

Europe
- Switzerland (1)
- Sweden (2)
- Netherlands (3)

Latin America and the Caribbean
- Chile (1)
- Costa Rica (2)
- Mexico (3)

Northern Africa and Western Asia
- Israel (1)
- Cyprus (2)
- UAE (3)

South East Asia, East Asia, and Oceania
- Singapore (1)
- Republic of Korea (2)
- Japan (3)

Sub-Saharan Africa
- South Africa (1)
- Mauritius (2)
- Kenya (3)

Northern America
- USA (1)
- Canada (2)
More innovation convergence is needed

- GII remains stable at the top
- China keeps rising
- Continued gap between developed and developing nations
- Low-income economies closing the gap

**Average scores**
- Top 10 (high income)
- 11–25 (high income plus China)
- Other high income
- Upper-middle income
- Lower-middle income
- Low income
Global Innovation Index

Innovation Efficiency Ratio

- Innovation Input Sub-Index
- Innovation Output Sub-Index
## Basic GII Structure (2/2)

### Innovation Input Sub-Index

1. Institutions
2. Human capital and research
3. Infrastructure
4. Market sophistication
5. Business sophistication

### Innovation Output Sub-Index

6. Knowledge and technology outputs
7. Creative outputs

The two sub-indices have the same weight.